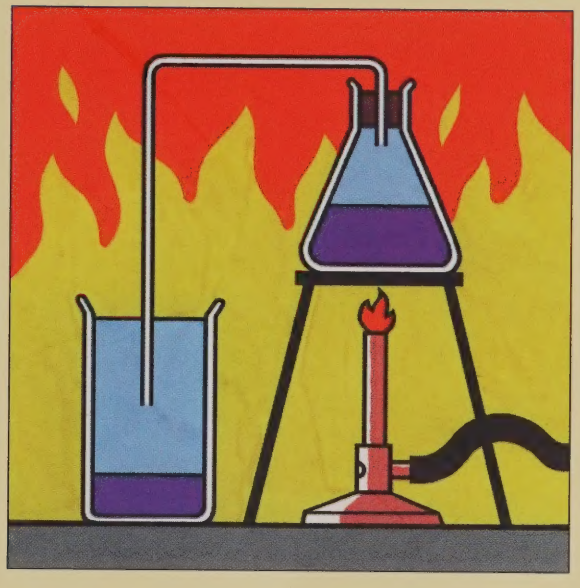
MCO 298

Firecode

Fire Practice Note 10

Laboratories on hospital premises



NHS Executive

NHS Estates
An Executive Agency of the Department of Health

Firecode

Fire Practice Note 10

Laboratories on hospital premises

London: HMSO

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An Executive Agency of the Department of Health

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About this publication

This Fire Practice Note (FPN) provides guidance on the additional fire precautions required when laboratory facilities are incorporated into the design of an NHS hospital. These are required because of the likely presence of infectious and radioactive substances, flammable solvents and gases, and reactive chemicals.

Laboratories are an essential part of the healthcare process, and health authorities need to consider the implications for patients, visitors and staff of any fire hazards within them.

Health authorities will need to select a combination of measures to produce a fire-safe design, taking into account:

a. this Fire Practice Note and associated Firecode documents;

b. all statutes and guidance relevant to the scheme as a whole;

c. the advice and approval of local building control and fire authorities;

d. the advice of health authority staff (estates staff, hospital fire safety and security advisers, building control etc).

The Home Office will distribute this Fire Practice Note to all Chief Fire Officers. The Note should be used as a basis for discussions with local fire authorities.

Executive summary

This Fire Practice Note (FPN) provides guidance on the standards of fire safety when laboratory facilities are about to be, or have been, established on hospital premises. In the case of new hospitals the guidance in this FPN should be considered at the initial planning stage.

This FPN also provides organisational and managerial guidance in the areas of accountability for fire safety, fire safety policy, emergency plans and staff training.

In relation to technical recommendations this guidance assumes that the physical fire precautions incorporated into the rest of the hospital meet the standards required by the appropriate Firecode guidance. The technical recommendations give an explanation of requirements in the areas of emergency and escape lighting, flammable and hazardous substances, data storage and electrical equipment.

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1.0 Introduction and scope

General application

1.1 This Fire Practice Note (FPN) provides guidance on the standards of fire safety when laboratory facilities are about to be, or have been, established on hospital premises. In the case of new hospitals the guidance in this Note should be considered at the initial planning stage.

1.2 Fire hazards in laboratories merit special attention due to the possible presence of infectious substances, flammable solvents and gases, radioactive substances and reactive chemicals. These create special hazards not generally encountered in other departments of a hospital.

1.3 This Note cannot take account of all the circumstances which may be found in any particular hospital, but the contents are intended to highlight particular health service aspects which may need to be considered.

1.4 The document provides sufficient guidance to ensure that when hospital laboratory facilities are planned or designed, they should not subvert the fire safety precautions in any adjacent patient care areas. In general, the fire hazard will be greatest in property not purpose-built for research work.

Consultation

1.5 Careful consideration should be given to the location of laboratory facilities within a hospital, taking into account functional and managerial relationships with other departments.

1.6 The structural suitability of the proposed building, type of activity, and its proximity to high life-risk buildings are all relevant factors. Account should also be taken of the constraints arising from safety and security considerations which may cause conflict with fire safety.

1.7 Structural fire precautions and the provision of means of escape should be considered at the earliest possible stage.

1.8 The statutory powers of:

a. the local authority with regard to building control and environmental health;

b. the local fire authority with regard to fire safety;

c. the Health and Safety Executive; and

d. Her Majesty's Inspector of Pollution

should be taken into account when new works, alterations or refurbishment of laboratory facilities are planned, and these bodies should be consulted at an early stage in the planning process.

1.9 In addition, the following should be involved at an early stage:

a. the local police crime prevention department;

b. security and fire safety advisers;

c. the radiation protection officer;

d. the insurance company for the trust,

to ensure that potential conflicts between security and fire safety are resolved.

Existing guidance

1.10 The guidance in this Fire Practice Note supplements that contained in:

a. Guide to fire precautions in existing places of work that require a fire certificate[1];

b. Code of practice for fire precautions in factories, offices, shops and railway premises not required to have a fire certificate[1];

c. Approved Document B[2][3][4];

and it should be read in conjunction with these documents.

1.11 General guidance on design, layouts, equipment and safety within laboratory departments may be found in:

a. Health Building Note 15 – 'Accommodation for pathology services';

b. guidance notes for the protection of persons against ionising radiations arising from medical and dental use.

(1) Published by the Home Office/the Scottish Office

(2) Published by the Department of the Environment

(3) Northern Ireland – Technical Booklet E 1994

(4) Scotland – The Technical Standards for compliance with Building Standards (Scotland) Regulations 1990

Other Firecode documents

1.12 This document should be read in conjunction with the recommendations contained in the latest revisions of the following Firecode documents:

a. 'Policy and principles'[1][4];

b. Nucleus fire precautions recommendations[2];

c. HTM 81 – 'Fire precautions in new hospitals'[3];

d. HTM 82 – 'Alarm and detection systems';

e. HTM 83 – 'Fire safety in healthcare premises: general fire precautions';

f. HTM 85 – 'Fire precautions in existing buildings';

g. HTM 86 – 'Fire risk assessment in hospitals';

h. HTM 87 – 'Textiles and furniture'[2];

j. FPN 5 – 'Commercial enterprises on hospital premises';

k. FPN 6 – 'Arson prevention and control in NHS healthcare premises';

m. FPN 7 – 'Fire precautions in patient hotels'

and any other applicable Firecode guidance as and when it is published.

(1) Scotland – Firecode in Scotland, Policy and Principles

(2) Not applicable in Scotland

(3) Scotland – Fire safety, new health buildings in Scotland

(4) Northern Ireland – Northern Ireland Firecode policy and principles

2.0 Glossary of terms

2.1 For the purposes of this document the following terms are defined:

- **compartment:** a building or part of a building, comprising one or more rooms, spaces or storeys, constructed to prevent the spread of fire to or from another part of the same building, or an adjoining building;
- **compartment floor:** a fire-resisting floor used to separate one fire compartment from another;
- **compartment wall:** a fire-resisting wall used to separate one fire compartment from another;
- **emergency lighting:** lighting, including standby lighting, provided for use when the supply to the normal lighting fails;
- **escape lighting:** that part of the emergency lighting which is provided to ensure that the escape routes are illuminated at all material times;
- **fire door:** door or shutter provided for the passage of persons, air or objects which, together with its frame and furniture as installed in a building, is intended when closed, to resist the passage of fire and/or gaseous products of combustion and is capable of meeting specified performance criteria to those ends;
- **fire resistance:** ability of an element of building construction, component or structure to fulfil, for a stated period of time, the required load-bearing capacity, fire integrity and/or thermal insulation and/or other expected duty in a standard fire resistance test;
- **place of safety:** a place where persons are in no danger from fire;
- **travel distance:** the horizontal distance to be travelled by a person from any point within the floor area to the nearest adjoining compartment, sub-compartment, escape stairway or external exit, having regard to the layout of walls, partitions, fittings and furniture.

3.0 Organisation and management of fire safety

Accountability for fire safety

3.1 The chief executive or general manager has overall responsibility for fire safety in all premises occupied or used by the trust or authority.

3.2 Effective management of laboratory facilities is often complicated by the number of functional managers who have responsibility and authority for different work carried out for specific clinical purposes. It is important that the manager responsible for fire safety in the laboratory facilities be specifically identified within the fire safety policy.

3.3 Any policy must ensure consistency within sub-areas of the facility which may be remote from the main laboratory location and deal with "lone" and out-of-hours working procedures.

3.4 The guidance in Firecode – 'Policy and principles' establishes a framework for the accountability for fire safety in premises owned or occupied by an NHS organisation. The guidance ensures acceptable standards of fire safety for patients, staff and visitors to all health service premises.

3.5 Wherever the ownership or the day-to-day management of laboratory facilities is with a non-NHS organisation, the contractual arrangements should provide that the design and operation will comply with the guidance contained within Firecode – 'Policy and principles'.

Fire safety policy

Requirement

3.6 Laboratory facilities should have a separate written fire safety policy. This should define clearly:

a. duties of management;

b. staff with specific responsibilities or duties (for example Laboratory manager, Health and Safety Officer, Nominated Officer (Fire));

c. fire safety procedures covering hot work or/and work with open flame or other unprotected heating elements;

d. duties of all staff;

e. procedures for lone and out-of-hours working;

f. arrangements for ensuring that contractors and temporary staff operating within the laboratory are aware of policies and procedures in the event of a fire;

g. that emergency services be made fully aware of the risks associated with the presence, use or storage of infectious, flammable or toxic substances including bottled gases. The location of each store should be indicated on a clearly marked site/laboratory plan;

h. that COSHH assessments of any hazardous substances located within each laboratory be readily available.

Emergency plans

3.7 If a fire occurs in a clinical laboratory there is a possibility that the ensuing activities, that is, fire-fighting, inspection, debris clearing etc, may present a risk to health due to the possible spread of infectious or other hazardous substances. Heads of departments should ensure that laboratory personnel and ancillary staff are fully conversant with the actions that should be taken in the event of an outbreak of fire.

Requirement

3.8 Laboratory facilities should have written emergency plans, which include:

- means for raising the alarm in case of fire;
- evacuation procedures;
- procedures to ensure that the staff identified in the fire safety policy are always available, 24 hours a day;
- details of flammable and/or health-threatening substances kept within the laboratories, and their location;
- location of equipment and procedure for first-aid fire-fighting;
- procedures to ensure the safety of contractors, visitors and patients in the event of a fire.

3.9 The emergency plan should be continually monitored and reviewed whenever there is a significant change in the management, staffing or internal layout of the laboratory facilities. The laboratory health and safety and the fire safety adviser should always be consulted.

3.10 A copy of the fire safety policy and emergency plan should be kept on the premises and be available for inspection when requested by an authorised person.

Training of staff

3.11 All staff have duties and responsibilities in respect of fire safety. Line managers are responsible for ensuring that fire safety policies and particular instructions are brought to the attention of staff and observed by them. They should also ensure that every member of staff participates in fire safety training and fire drills.

3.12 It is essential that laboratory staff are familiar with the safe use and operation of all equipment. The identification and reporting of faulty controls, sensors and indicating devices is important to enable potentially dangerous or faulty equipment to be withdrawn from service.

Requirement

3.13 All staff who work in laboratory facilities should attend fire safety training at least once in every 12-month period. The training should cover:

a. special fire safety hazards found within laboratories, particularly where related to equipment, handling and connection of gas cylinders and pipelines, flammable solutions and oxygen-enriched atmospheres;

b. in particular, staff who need to handle liquid oxygen, hydrogen peroxide, nitrates or similar substances should be made fully aware of the risks associated with such substances, especially awareness that clothing in an oxygen-enriched atmosphere may become impregnated and easily ignite; also that "high test peroxide" may spontaneously ignite cellulosic material;

c. all the relevant training provisions set out in subsections 5.1 to 5.5 of HTM 83 – 'Fire safety in healthcare premises – General fire precautions'.

3.14 Records should be kept by laboratory management of training and instruction given to staff; this should include:

- the date of the instruction or exercise;
- the duration;
- the name of the person giving the instruction;
- the names of the people receiving the instruction;
- the nature of the instruction, training or drill.

3.15 When a fire drill reveals defects in the emergency plan, the means of escape or the means for giving warning, the record should include every defect, and should detail the action taken to remedy each one.

4.0 Technical recommendations

4.1 This section considers the physical fire precautions additional to those in HTM 81 or HTM 85, which are required when a laboratory facility is incorporated into the design of new or existing hospitals.

4.2 The guidance in this section assumes that the physical fire precautions incorporated into the rest of the hospital are to the standards required by the appropriate Firecode guidance. For example, new hospitals should comply with the guidance in HTM 81 and existing hospitals with HTM 85, or should achieve an equivalent level of fire safety when assessed against the requirements of HTM 86.

General

4.3 The following factors should be addressed when considering the location of laboratories:

a. they should not be utilised for means of escape by patients or staff from other hospital departments or wards;

b. as laboratories are considered to be sources of infection and fire hazard areas, they should not be located in areas frequented by the public;

c. good access should be available for fire brigade vehicles;

d. exhausts from ventilation systems should discharge safely to avoid ingestion by neighbouring supply ventilation systems or entry into adjacent windows of naturally ventilated spaces;

e. laboratory stores (including external storage for flammable liquids and gases) should be easily accessible from the laboratory work areas.

4.4 'The guide to fire precautions in existing places of work that require a fire certificate' provides general guidance on fire precautions. Although the guide is for premises requiring a fire certificate, NHS Estates consider that some of the guidance it contains is also applicable to hospital laboratories that do not require a certificate.

Requirement

4.5 All laboratory rooms and areas should be enclosed in 30 min fire-resistant construction and provided with fire-resistant self-closing doors.

4.6 The guidance in Part II of 'The guide to fire precautions in existing places of work that require a fire certificate' should be followed with respect to the following:

a. surface finishes of walls, ceilings and escape routes;

b. assessment of fire risk and associated life risk;

c. means of escape;

d. means for fighting fire.

4.7 Health Technical Memorandum 82 – 'Alarm and detection systems' gives guidance on suitable levels of automatic detection within laboratory facilities.

Emergency and escape lighting

4.8 All escape routes, including external, need to be provided with adequate artificial lighting to facilitate escape.

4.9 Certain types of activity within laboratories, particularly where flammable or dangerous substances are used, are such that an interruption in normal lighting is an unacceptable hazard. In such circumstances, emergency lighting should be provided and attention is drawn to Health Technical Memorandum 2011 – 'Emergency electrical services – Design considerations', which sets out criteria for such lighting.

Requirement

4.10 Escape lighting to BS5266: Part 1: 1988 should be provided to illuminate corridors, stairway exits and any exit signs. Alternatively, escape lighting designed to the requirements set out in HTM 81 – 'Fire precautions in new hospitals', or HTM 85 – 'Fire precautions in existing hospitals' as appropriate, should be installed.

4.11 Emergency lighting designed to the provisions of HTM 2011 should be provided in those areas where the interruption of normal lighting provision would present an unacceptable risk of fire or unacceptable hazard.

Flammable substances – general

4.12 It is important that the risks of flammable substances are correctly assessed and that information is available regarding their properties and the hazards posed in their use.

Requirement

4.13 Assessments of flammable substances should be carried out under the provisions of the Control of Substances Hazardous to Health (COSHH) Regulations 1994.

4.14 The provisions of the Chemicals (Hazards, Information and Packaging for Supply) Regulations 1994 should be followed with regard to labelling of flammable substances during storage and use.

The storage of flammable substances

Requirement

4.15 Bulk storage of combustible substances should be in a central lockable laboratory store, protected by 60 minute fire-resistant construction.

4.16 Extremely and highly flammable liquids should be stored in accordance with the guidance in HS(G)51 – 'The storage of flammable liquids in containers', the Highly Flammable Liquids and Liquefied Petroleum Gases Regulations 1972[1] and the Petroleum Consolidation Act 1928.

(1) Highly Flammable Liquids and Liquefied Petroleum Gases (Northern Ireland) Regulations 1975

4.17 All rooms where flammable substances are stored should be considered as fire hazard rooms and be enclosed in 30 minute fire-resistant construction.

4.18 Radioactive or toxic substances, cylinders of compressed gas whether flammable or not, and other materials which might impede fire-fighting should, as far as possible, be segregated. Places where such substances or materials are used should be easy to access from outside the building to facilitate possible removal in the event of fire. Rooms containing such substances or materials should be appropriately signed, and the local fire brigade informed of their location.

4.19 Refrigerators used for storage of solvents which give off flammable vapours should be of the appropriate type, that is, the heating element and the electrical switches should not be able to cause the ignition of flammable vapours.

4.20 Non-combustible containers with lids should be provided for the disposal of combustible waste material such as filter papers, wiping cloths, residues etc. Such waste should be removed from the laboratory daily to an external store.

The use of flammable substances

4.21 As previously indicated, the quantities of infectious substances, flammable liquids, solvents and gases, and other reactive substances likely to be present, require that fire safety in laboratories receive special attention.

4.22 Other hazards within laboratories include:

- electrical fires due to the large amount of powered equipment;
- quantities of infectious substances;
- naked flames, for example bunsen burners;
- quantities of combustible materials, for example paper and packaging.

4.23 Flammable and combustible liquids should be handled with care and with knowledge of their hazardous properties, both individually and in combination with other materials with which they may come into contact.

4.24 Acetylene gas installations require special attention, and guidance is available in WKO(78)3.

Piped services

Requirement

4.25 All pipelines should be installed in accordance with Health Technical Memorandum 2022 – 'Medical gas pipeline systems'.

4.26 Acetylene gas installations should be installed following the guidance contained in WKO(78)3.

4.27 Liquids such as diethylether and petrol, flowing in conductive tubing, may generate an electrostatic charge and discharge at an earth point, causing a fire. Such liquid systems should be adequately earthed.

4.28 Cylinders of compressed gas should, so far as possible, be kept out of doors and the supply piped, through narrow bore piping, to the usage point. Where this is impracticable, only minimum quantities should be taken to the laboratory. The valves of any cylinders taken into the building should be shut off when the contents are not required for use.

Flammable liquids

Requirement

4.29 Quantities of flammable liquids in laboratory departments should be restricted as much as possible, preferably to one day's supply. All reserves beyond this should be kept in a specially designated store outside the building.

4.30 The maximum size of any container on a bench containing a highly flammable liquid should not exceed 500 ml.

4.31 Operations involving flammable liquids should preferably take place in suitable fume cupboards or over metal trays so that any accidental spillage and/or subsequent fire can be restricted.

4.32 Adequate non-combustible absorbent material should be provided to deal with spillages.

4.33 Waste flammable liquids should not be disposed of by the normal drainage system; they should be deposited in closed containers and dealt with separately. Care should be excercised to avoid mixing incompatible liquids.

4.34 Wherever feasible, the heating of flammable substances should be by steam or hot water. Where this is not possible, a heating mantle should be used rather than apparatus with unprotected heating elements.

Flammable gases

Requirement

4.35 The total quantity of flammable gases in laboratory departments should be kept to the minimum needed for effective operations.

4.36 Only pressure valves and regulators appropriate to the type of gas should be used, and all valves should be closed when a supply is not required.

4.37 Suitable non-return valves should be installed where there is a possibility of a gas supply system feeding back into a lower pressure system.

(1) Gas Safety (Installation and Use) Regulations (Northern Ireland) 1995

4.38 Fuel gas outlets should comply with the requirements of the Gas Safety (Installation and Use) Regulations 1994[1].

4.39 Outlets for Bunsen Burners must be controlled by a safety cock. Gas outlets should not be provided inside microbiological safety cabinets.

Storage of hazardous substances and gases

4.40 Hazardous substances should be stored in such a way as to minimise the possible damage or loss caused to them by a laboratory fire. Also, consideration should be given to the potential risk to members of the emergency services that could result from the release of hazardous substances by a fire.

Requirement

4.41 Culture materials should be securely stored, and clearly marked and identified to prevent their accidental dispersal during or after a fire.

4.42 Stock culture should, as far as practicable, be protected by fire-resistant containment when not in use, for example placed in metal cupboards, incubators, or cold rooms, which will normally provide sufficient short-term protection from fire.

4.43 Containers for toxic substances should be protected from becoming easily damaged or having their contents released.

Safety cabinets and fume cupboards

4.44 Guidance on mechanical ventilation to safety cabinets and fume cupboards is available in HTM 2025 – 'Ventilation in healthcare premises', 'Health Equipment Information No 86' and BS7258: 1990. The risk of contamination is such that fire dampers are inappropriate in safety cabinet extract ducts.

4.45 There is always a possibility of a fire or an explosion occurring within, and not being contained by, the fume cupboard. It is important that means of escape are not compromised by this risk.

Requirement

4.46 Where extract systems pass through compartment or sub-compartment walls or floors, fire dampers should **not** be fitted. All such ducts should to be provided with fire protection to the same standard as the wall or floor through which they pass.

4.47 Fume cupboards should not be sited in a position where an exit to an escape route would necessitate passing directly in front of the cupboard.

Data storage

4.48 Increasingly, results of tests and experimental data are being stored on floppy disks/hard drives located within laboratory facilities. Management procedures should be put into place to ensure that any fire will not result in the loss of key patient information. This could be achieved by copying the information and storing the data either in remote premises or in fire-safe containers.

Requirement

4.49 Effective procedures should be put in place to ensure the safety of key patient data that is stored on floppy disks/hard drives.

Electrical equipment

4.50 Special electrical fittings should not normally be necessary in general laboratories but plugs, sockets, switches and other equipment need to be located away from areas where there is any likelihood of accidental spillage of liquids having flammable vapours.

4.51 The improper use of electrical equipment with long trailing leads in laboratories, particularly those using flammable or corrosive chemicals and frequent use of water, present a hazard.

4.52 The need to leave electrical equipment active for continuous periods whilst the laboratory is unattended presents a hazard, and procedures should be established to ensure safety.

Requirement

4.53 Electrical plugs, sockets, switches and other electrical equipment should be located away from areas where there is a likelihood of accidental spillage of flammable liquids.

4.54 Sufficient provision of socket-outlets should be made to avoid the need for long trailing leads in laboratories, and all portable electrical equipment should be subject to regular testing in accordance with the Electricity at Work Regulations 1989.

4.55 Wherever possible, a master switch located near the door should be arranged so that the electricity supply to experiments can be cut off at will, preferably at the end of each working day. If experiments have to run during unattended hours, a notice signed by a senior officer should be displayed near the master switch to indicate that the power should be left on.

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SI 1180:1992 The Building Regulations (Amendment) Regulations. HMSO, 1992.

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2011 – Emergency electrical services. NHS Estates, HMSO 1993. (issued in 4 parts)

2022 – Medical gas pipeline systems. NHS Estates, HMSO 1994. (issued in 5 parts)

2025 – Ventilation of healthcare premises. NHS Estates, HMSO 1994. (issued in 4 parts)

Firecode in Scotland

Policy and principles. Scottish Office Home and Health Department, HMSO 1994.

Fire safety: new health buildings in Scotland. Scottish Home and Health Department, HMSO 1987.

The guide to means of escape and related safety measures in existing houses in multiple occupation in Scotland. Scottish Home and Health Department, HMSO 1988.

British Standards

BS 5266 Emergency lighting

Part 1: 1988 Code of practice for the emergency lighting of premises other than cinemas and certain other specified premises used for entertainment.

BS 7258 Laboratory fume cupboards

Part 1: 1994 Specification for safety and performance.

Part 2: 1994 Recommendations for the exchange of information and recommendations for installation.

Part 3 : 1994 Recommendations for selection, use and maintenance.
Part 4: 1994 Method for determination of the containment value of a laboratory fume cupboard.

Miscellaneous references

Fire Precautions Act 1971: guide to the fire precautions in existing places of work that require a fire certificate: factories, offices shops and railway premises. Home Office and the Scottish Office, HMSO 1993.

Northern Ireland Firecode – policy and principles. Northern Ireland Estates Services Directorate, HMSO 1994.

Code of practice for fire precautions in factories, offices, shops and railway premises not required to have a fire certificate. Home Office, HMSO 1992.

Microbiological safety cabinets: recommendations concerning their choice, installation, routine maintenance and use (Health Equipment Information 86). Medical Devices Directorate, DHSS, 1980.

Acetylene gas installations (WKO(78)3). DHSS, 1978.

Other Firecode publications

(Given below are details of all documents which, together, form 'Firecode'. Information is correct at time of publication of this Fire Practice Note.)

Firecode

Policy and principles, 1994. HMSO
Nucleus fire precautions recommendations, 1989. HMSO

Health Technical Memoranda

81 Firecode: fire precautions in new hospitals, 1996. HMSO
82 Alarm and detection systems, 1996. HMSO
83 Fire safety in healthcare premises: general fire precautions, 1994. HMSO
84 –
85 Fire precautions in existing hospitals, 1994. HMSO
86 Fire risk assessment in hospitals, 1994. HMSO
87 Textiles and furniture, 1993. HMSO

Fire Practice Notes

1 Laundries, 1987. HMSO
3 Escape bed lifts, 1987. HMSO
4 Hospital main kitchens, 1994. HMSO
5 Commercial enterprises on hospital premises,1992. HMSO
6 Arson prevention and control in NHS healthcare premises, 1992. HMSO
7 Fire precautions in patient hotels, 1995. HMSO
8 Atria, 1995. HMSO
9 NHS healthcare fire statistics 1994/95, 1996. HMSO

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http://www.open.govt.uk/nhsest/hpage.htm

Some NHS Estates products

Activity DataBase – a computerised briefing and design system for use in health buildings, applicable to both new build and refurbishment schemes. *NHS Estates*

Design Guides – complementary to Health Building Notes, Design Guides provide advice for planners and designers about subjects not appropriate to the Health Building Notes series. *HMSO*

Estatecode – user manual for managing a health estate. Includes a recommended methodology for property appraisal and provides a basis for integration of the estate into corporate business planning. *HMSO*

Concode – outlines proven methods of selecting contracts and commissioning consultants. Reflects official policy on contract procedures. *HMSO*

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